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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/786,787 05/10/01 COTTON

M 2654-005US

EXAMINER

MM91/1003

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ART UNIT

PAPER NUMBER

2841

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

Commissioner of Patents and Trademarks

## Office Action Summary

Application No.

09/786,787

Applicant(s)

COTTON, MARTIN A.

Examiner

Quynh-Nhu H. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the recited feature "the trench having a length greater than two times a breadth of the trench" of claim 2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the recited feature of claims 3, 13, 16-17 such as "a first wire trace applied to main surface ... a connection between the first and second wire trace terminal landing pads and the plated through hole" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

### ***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification does not support the limitation "the trench having a length greater than two times a breadth of the trench", as recited in claim 2. Likewise, the specification does not support the limitations of claims 3, 13 and 16-17 (i.e. a first wire trace having a first through hole, a printed circuit board first insulation layer formed over the first wire trace having second through hole, a second wire trace applied to the insulation layer having a second terminal landing pad with a third through hole having identical geometry to and vertically aligned with the first and second through holes). Furthermore, please clarify specific section in the specification in which applies to claims 3, 13 and 16-17.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 9 recites the limitation "the ground plane" in lines 19. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. Claims 1, 3-4, 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Sen et al. [US 5,414,222].

As to claim 1, Sen et al. disclose in Figs. 2-3F a wiring connection structure for printed circuit board, characterized by: a through-hole (24 in Fig. 2 or Figs. 3A-3F) with a convoluted shaped cross section having an interior wall that vertically extends through and intersects and exposes a plurality of wire circuit traces (21, 31) and a plating of conductive material is inherent applied to the interior wall electrically connecting a plurality of wire exposed circuit traces on a plurality of circuit layers.

It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior

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art apparatus satisfying the claimed structural limitations pertaining to phrase "for interconnecting wiring circuit traces on a plurality of circuit trace layers applied on a plurality of printed circuit board layers and electrically isolated there between by the printed circuit board layers and having a printed circuit board multi-layered structure:. Ex Pane Masham, 2USPQ F.2d 1647 (1987).

As to claims 3-4,13 and 16, Sen et al. disclose in Figs. 2-3F (also see attachment) a wiring connection structure having a first wire circuit trace (31) having a width applied to a main surface (30) and having a first terminal land pad with a terminal width the same as the width of the first wire trace and having a first through hole with a major and minor diameter where in minor diameter where the minor diameter is less than the width of the first trace and the major diameter is elongated and directional along a direction of the terminal landing pad; a printed circuit board first insulating layer (20) formed over the first wire trace having a second through hole (24) having identical geometry and orientation as and vertically aligned with the first through hole and extending to the first wire trace terminal landing pad; and second wire circuit trace (21) applied to the printed circuit board first insulation layer having a second terminal land pad with a third through hole having identical geometry to and aligned with the first through hole, wherein the first, second and third through holes are adjoining and are plated there through with an electrically conductive material forming a plated through hole vertically intersecting the first and second terminal pads and electrically connecting the first wire trace and the second wire trace by a connection between the first and second landing pads and the through hole.

It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations pertaining to phrase "for interconnecting a plurality of wiring circuit traces applied on a plurality of printed circuit board

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layers and electrically isolated by the printed circuit board layers and having a printed circuit board first layer with a main surface". Ex Pane Masham, 2USPQ F.2d 1647 (1987).

As to claims 14-15, Sen et al. disclose in Fig. 3 wherein the major diameter is at least about twice / three times that of the minor diameter.

As to claim 17, since the method of manufacturing the device is merely a list of steps of forming, these steps must be performed in order to obtain the device (see rejection of claims 13-15 above). Therefore, the method of manufacturing would be inherent to the shown structure of the device.

8. Claims 2, 9-12, 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Harada et al. [US 5,966,294].

As to claim 2, Harada et al. disclose in Fig. 3 an EMI shielding structure for a printed circuit board comprising: a trench having a rim about an opening of the trench at a top printed circuit board layer and the trench extending through a plurality of printed circuit board layers to a grounding plane (140) exposing the grounding plane and the trench having an interior wall with a conductive plating material applied over the wall; Harada et al. clearly show the trench having a length greater than two times a breadth of the trench and the wall vertically extends around the perimeter of the printed circuit board and the plating electrically connects to the exposed ground plane and wraps over and laterally extends from the rim forming a lip.

It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations pertaining to phrase "for shielding wiring circuit traces on a plurality of circuit trace layers applied on a plurality of printed circuit board layers and electrically isolated there between by the printed circuit board layers and

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having a printed circuit board multi layer structure". Ex Pane Masham, 2USPQ F.2d 1647 (1987).

As to claims 9-12, Harada et al. disclose in Fig. 3 a reference plane structure of a printed circuit board comprising: a first wire trace circuit layer (141b, 141c) applied to a main surface; a first printed circuit board-insulating layer formed over the first wire trace circuit layer; a first reference plane (140) applied over the first printed circuit board-insulating layer; a trench having an interior wall and extending about a perimeter encompassing the first wire trace circuit layer and extending through the printed circuit board first layer, extending through and exposing the first wire trace circuit layer; extending through the first insulation layer and extending to the reference plane exposing the reference plane; and a conducting plating layer on the interior wall electrically connecting the first wire traces layer to the ground plane; wherein the perimeter encompasses a portion of the first trace circuit layer (141b, 141c).

It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations pertaining to phrase "for fixing a potential reference for a plurality of wiring circuit trace layers that are electrically isolated there between by a plurality of printed circuit board layers and having a printed circuit board first layer with a main surface". Ex Pane Masham, 2USPQ F.2d 1647 (1987).

As to claim 20, since the method of manufacturing the device is merely a list of steps of forming, these steps must be performed in order to obtain the device (see rejection of claims 2, 9-12 above). Therefore, the method of manufacturing would be inherent to the shown structure of the device.

As to claims 21-22, Harada et al. disclose in Fig. 3 an EMI shielding structure comprising: a printed circuit board having a plurality of wire trace circuit layer (141b, 141c) and a

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plurality of printed circuit board insulation layers there between and having a plurality of printed circuit board edges and a ground plane (140); and a first trench (on the right hand side) having an interior wall and extending in parallel with the board edge within a perimeter defined by the board edge encompassing the printed circuit board wire circuit trace and extending through the printed circuit board layers and extending to the ground plane, exposing the ground plane; and electrically conductive plating material (141a, 141d) applied over the interior wall there through and electrically connecting to the exposed ground plane providing at least a partial perimeter shield for the printed circuit board.

It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations pertaining to phrase "for shielding a plurality of wire circuit trace layers that are electrically isolated by printed circuit board layer". Ex *Pane Masham*, 2USPQ F.2d 1647 (1987).

As to claim 23, a second trench (on the left hand side) having an interior wall and extending wholly within and in parallel with an outer perimeter defined by the first trench and extending through the printed circuit board layers and extending to the ground plane exposing the ground plane; wherein the second interior wall is plated with electrical conductive plating material (141a, 141d) applied over the interior wall there through and electrically connecting to the exposed ground plane.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the



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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 3-4 alternatively are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamperman et al. [US 5,734,560] in view of Sen et al.

Kaperman et al. disclose in Figs. 1-2 (also see attachment) a wiring connection structure for a printed circuit board, characterized by: a first wire trace applied to a main surface having a first terminal land pad with a first through hole there through-hole; a printed circuit board first insulation layer formed over the first wire trace having a second through hole of identical cross sectional geometry and vertically aligned with the first through hole and extending to the first terminal landing pad exposing a portion of the first land pad; and a second wire trace applied to the printed circuit board first insulating layer having a second terminal landing pad; wherein the first and second through holes are adjoining and are plated there through with an electrically conductive material forming a plated through hole; wherein the vertically intersects the first and second terminal pads and electrically connects the first wire trace and the second wire trace by a connection between the first and second wire trace terminal landing parts and the plated through hole. Kaperman et al. disclose only two through holes are connected. However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ more than two through holes (i.e. another third through hole having identical geometry with the first and second through holes, as Kaperman et al. taught in col. 1, lines 48-50 or col. 2, lines 47-50) in order to improve surface for mounting electronic device. Kaperman et al. do not disclose the through hole having a convoluted shaped cross section.

Sen et al. disclose in Figs. 3A-F a through hole has a shaped continuous curve cross section. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ the through hole having a convoluted shaped cross section, as Sen et al. in order to have a characteristic inductance property.

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It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations pertaining to phrase "for interconnecting wiring circuit traces applied on a plurality of printed circuit board layers and electrically isolated by the printed circuit board layers and having a printed circuit board first layer with a main surface". Ex Pane Masham, 2USPQ F.2d 1647 (1987).

11. Claim 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaperman et al. in view of Sen et al. as applied to claims 3-4 above, and further in view of Mattei [US 5,522,132].

Kaperman et al. and Sen et al. disclose all claimed subject matter except for the continuous curved cross section is "U" shaped.

Mattei discloses in Fig. 5 the continuous curved cross section "U" shaped.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ the through hole having U shaped, as taught by Mattei, in order to reduce insertion loss and return loss and to improve isolation.

As to claims 6-8, Kamperman et al., Sen et al. and Mattei disclose(s) the claimed subject matter except for the through hole having the "L" shaped/ "+" shaped. It would have been obvious matter of design choice to "L" shaped, "+" shaped, since applicant has not disclose the "U" shaped, "L" shaped, "+" shaped solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with convoluted shaped i.e. "U" shaped.

12. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sen et al.

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Sen et al. disclose all claimed subject matter except for plasma ablation/laser method. However, it well known in the art to using the plasma ablation or laser method, as Applicant discloses in the specification on page 2-3.

13. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. in view of Inoue et al. [US 5,270,493].

Harada et al., disclose all claimed subject matter except for an EMC sensitive track of conductive material.

Inoue et al. disclose in Fig. 2 an EMC sensitive track (7) of conductive material extending and parallel with an outer perimeter defined by the first elongated through-hole (8) and disposed between circuit board insulating layer (2, 3) through which the trenched through-hole extends.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ the EMC sensitive track, as taught by Inoue et al., for the benefit of reducing an electromagnetic wave.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quynh-Nhu H. Vu whose telephone number is 703-305-0850. The examiner can normally be reached on 7:30-5:00 (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 703-308-3301. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

QNV  
September 28, 2001

A handwritten signature in black ink, appearing to be "Macl", written in a cursive style.